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Current Support Memorandum

Large Expansion Planned for USSR Chemical Industry

Importance of Chemical Industry

The importance of a well-developed chemical industry in a modern industrial economy was highlighted at the plenary meetings of the Central Committee of the CPSU held on May 6 and 7. According to the Plenum, "The accelerated development of the chemical industry must become a national cause." 1/ The development of the chemical industry, and primarily of synthetic materials, stipulated in the measures of the Presidium of the Central Committee of the CPSU and the Council of Ministers of the USSR, is "a most important factor in the technical progress of all national economy and in the further development of heavy industry, and it is a new large source of raw materials for the production of consumer goods." 2/

Khrushchev's report at the plenary session on May 6 on the development of the USSR chemical industry also pointed up the importance of the industry.

"The necessity of the speeded-up development of the chemical industry, as one of the decisive branches of heavy industry, is dictated by the interests of the further upsurge of the country's economy and of the struggle for the technical progress, by the tasks in the field of increasing the output of consumer goods."

"Chemistry, along with metallurgy, the fuel and power industry, and the machine building and construction industry plays an important part in the fulfillment of the plans of communist construction and in the solution of the principal economic task of the USSR - to catch up with and outstep as soon as possible the most developed capitalist countries in per capita output." 3/

and

"...in our days the chemical industry is assuming a growing importance in the development of the country's economy and in the development of many branches of the national economy." 4/

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- 2 -

Planned Expansion of the Chemical Industry

As a result of the meetings, the USSR chemical industry is scheduled for a continued growth, with special emphasis on increased output of synthetic fibers, plastics, and other synthetics to meet requirements for industrial and consumer goods. By the end of 1965, production capacity of artificial and synthetic fibers is to be 4.6 times the 1957 level; while the capacity of plastics and synthetic resins is to be 8 times and synthetic rubber 3.4 times the 1957 levels. 5/ Large increases in production of basic chemicals and other products are also scheduled. The 1965 output of ammonia, caustic soda, soda ash, sulphuric acid, and tires is to be double the 1958 production; while mineral fertilizer production is also planned for a considerable increase. 6/

Fulfillment of the planned goals, according to the Plenum, is of "tremendous importance for future technical progress in all branches of the national economy, for the development of production forces, and for the most efficient utilization of natural resources of the country, with an end to meeting the needs of the population as regards fabrics, clothings, and other mass consumer goods." 7/ *

* While press reports have stressed the portions of the results of the plenary meetings dealing with consumer goods, 8/ Khrushchev's report on the chemical industry also indicated the importance of synthetics for military and industrial uses, particularly in the replacement of nonferrous metals. 9/ According to Khrushchev one ton of plastics will replace an average of 3 tons of nonferrous metals in machine building. 10/

Furthermore, as Khrushchev reported, "Without further development of the heavy industry, without constant improvement in technology, we cannot successfully solve the problems of gradual transition to communism. To relax our attention to heavy industry would mean a break in the development of the economy, to stay to consumer policy and to eat up everything we produce. This in turn would lead to lagging behind, and could in the end result in the loss of positions gained."

"Our party has always pursued and will continue to pursue relentlessly the Leninist policy of priority development of heavy industry and the development of all branches of the national economy on that basis." 11/

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- 3 -

To accomplish this goal, over 100 billion rubles (about \$25 billion at the official exchange rate) are to be allocated. During 1958-65, 257 enterprises of chemical and related industries are to be built or reconstructed, including the completion of 37 plants which are under construction, construction of 120 new plants, and the expansion of 100 enterprises.

Planned Expansion of Chemical Equipment and Machine Building Plants

Besides the investment for increased research and development work and chemical plant expansion, capital expenditures in chemical machine building are scheduled for a large increase. As Khrushchev noted, "The task ahead of us is to expand seriously the production basis on the enterprises making equipment for the chemical industry." 12/

Out of the above 120 new plants, 14 are to manufacture chemical equipment; and 42 plants of the 100 enterprises planned for expansion are plants for the manufacture of chemical equipment, textile technological equipment for the artificial and synthetic fiber industry, fittings, pumps, and compressors. In addition, the plan calls for the specialization of chemical equipment manufacture in a number of existing machine building plants and to make use of the productive capacities of enterprises of the defense industry for this purpose.

With the planned increase in capital investment for chemical machine building, the output of chemical equipment is scheduled for a large growth. During 1957-1965, planned production of chemical equipment is to increase over 3 times; while the production of fittings, which are in short supply and restrict the expansion of chemical and other industrial plants, is scheduled for an increase of 8 to 9 times. 13/

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- 4 -

Economic Benefits of Planned Chemical Goals

Despite the past growth of the USSR chemical industry, the demands of the Soviet economy for many chemical products are greater than the available supply. In particular, the USSR is still lagging seriously behind some of the Western countries in the production of artificial and synthetic fibers, plastics, and other synthetic materials, 14/ and, as noted above, particular emphasis is to be given in this field under the expansion plan for the chemical industry.

In the accelerated program, there is to be continued emphasis on the utilization of petroleum and natural gases for petrochemical production as well as products of the coke chemical industry. 15/ According to the directives of the former Sixth Five-Year Plan (1956-1960), "It is one of the vital tasks of the chemical industry to raise drastically the utilization of petroleum, natural gases, and petroleum products for the production of synthetic rubber and alcohol, detergents, and other chemical products, with the view to reducing considerably expenditure of grains, vegetable oils, and other kinds of food raw materials." 16/ One of the goals of the former Sixth Five-Year Plan was the complete substitution of petroleum and natural gas raw materials in place of food products for the production of synthetic products. 17/

Up to the present time, a considerable quantity of food products has been used by the USSR chemical industry for the production of chemical products. At the beginning of the Fifth Five-Year Plan (1951-1955), the manufacture of ethyl alcohol, which is used in the USSR for the production of synthetic rubber and other technical purposes, required 1 million tons of grain, 1.7 million tons of

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- 5 -

potatoes, and about 700,000 tons of molasses. In 1955, 2 million tons of grain and 1.9 million tons of potatoes were used for alcohol production, and as much as 400,000 tons of animal fats were used for manufacture of soap, detergents, drying oils, and other chemical products. 18/ The consumption of large quantities of food materials for the production of ethyl alcohol and other synthetics has continued. In 1957, the USSR used food materials equivalent to 1.7 million tons of grain, and plan fulfillment for the production of synthetic detergents and other synthetics will provide a saving of at least 400,000 tons of food oils in 1956. 19/

The development and expansion of petrochemical production in the USSR will not only relieve the agricultural problem but also contribute to the fulfillment of the production goals for chemical and allied products, including synthetic fibers, alcohol, and rubber, fertilizers, plastics, and other synthetics by supplying cheap raw materials such as acetylene, hydrogen, ethylene, and many others.

In addition, the development of the petrochemical industry will make use of valuable raw materials which have been largely wasted. According to the Minister of the Petroleum Industry, about 3 billion cubic meters of petroleum gas, or nearly one-half of the associated gas coming to the surface with crude petroleum is allowed to escape or burned in flares. 20/ Khrushchev also noted in his report on the chemical industry the large waste and inefficient use of petroleum raw materials as he remarked "...while quietly seeing billions of cubic meters of more valuable petroleum gas being burned as waste." Oil gas

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- 6 -

byproducts are being used uneconomically. Only a small amount is used in the production of synthetic products and are being used as a fuel without the preliminary extraction of valuable raw materials. 21/*

Besides making use of available raw materials, the development of the petrochemical industry will provide other economic benefits, including lower investment and production costs,** as well as providing new synthetic products for use in the USSR economy.

The importance of synthetics was noted repeatedly in his discussion on the importance of the chemical industry in the national economy.

"Of all the important problems in the development of the chemical industry, one of the most important is the question of the development of the output of artificial and synthetic fiber, plastics, and other synthetic materials and articles made from them to satisfy the demands of the population and the needs of the industry.

". . . the importance of synthetic materials is also due to the fact that at (the) present stage of development of productive forces they

* A similar condition exists in the utilization of coke gas for the production of coal-tar chemicals, which are important raw materials for the manufacture of synthetic and a wide range of chemical products. In 1955, only 5.3% of the 15 million cubic meters of coke gas was utilized in the production of ammonia and organic chemicals, with the remainder used by metallurgical plants simply as a fuel. 22/

** The production of acetylene, as important raw material for a wide range of chemicals and chemical products, from petroleum sources would decrease the demand for electrical power in the manufacture of calcium carbide, which is the intermediate chemical used in acetylene production. [redacted] production 25X1 of acetylene from methane requires 2.7 times less electrical power than the carbide method. For other examples of reduced investment and production costs, see Production of Chemical Equipment in the USSR. 23/

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- 7 -

are the most important factor in further technical progress and in the rapid growth of the productivity of communal labor in all branches of the economy.

"At present one of the most important and urgent tasks to be dealt with is: In a short time to secure a rapid development of the chemical industry and to create a powerful industry producing polymers. Under the present conditions, this problem is of enormous state and political importance.

"... It is difficult to have a branch of industry where it would not be possible to use synthetic materials. The use of plastics makes it possible to considerably increase the productivity of communal labor, to lower costs of production, to raise the period of service-ability of machines and to save enormous natural resources.

"... The development of technology in various spheres is making fresh demands on the materials used. These demands cannot be satisfied if only natural materials are used. Therefore, the solution of complicated present day problems of modern technology cannot be effected without synthetic materials which possess properties which are not possessed by either metals or other natural materials ... Replacement of nonferrous metals is particularly important." 24/

Although, as noted earlier, press reports of the plenary sessions have highlighted the use of synthetics for consumer goods. Khrushchev also pointed out the uses for both industrial and military purposes. Among the latter indicated in his report are in tank production, rocket engines, and aircraft. 25/

Problems in Meeting Chemical Goals

Problems in chemical technology and supplies of chemical equipment have hindered the expansion of the USSR chemical industry.* and the solution of these problems will

* See Production of Chemical Equipment in the USSR, Chapters IV and VI. 26/

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- 8 -

affect the current expansion plan.

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[REDACTED] a weak point in the well-known

gap between research on chemical processes and the design of chemical equipment which occurs in many research institutes, 27/ and Khrushchev indicated the work to be done in this field.

"The further development of the chemical industry and especially the increased production of polymers, of artificial and synthetic fibers, plastics and synthetic rubber, is only possible if the most modern technological methods of production of chemicals are worked out and introduced.

"... overall development of scientific research and experimental work in the field of chemistry now assumes decisive importance. Without the further development of theoretical research and the expansion of experiment on new polymers with the maximum use of the most modern achievements of physics and chemistry, it is impossible to carry out the planned tasks.

"... It must be admitted at the same time, that in spite of the generally high level of the development of the science of chemistry in the USSR, there still exists a considerable lag in certain areas. This is primarily applicable to the field of artificial and synthetic fibers and plastics.*

"... The task of liquidating this lag in the development of research and experimental work in the field of production of chemical products now confronts in all its clarity the scientists and engineers of our country.

* The postwar innovations in the Soviet plastics industry, for example, could not have been accomplished without the equipment and technical assistance from East Germany.

Although Russian chemists know how to make many of the newer types of plastics, the necessary production methods have not been worked out since Soviet production experience lags considerably behind the technical competence of Soviet scientists. 28/

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- 9 -

" . . . One must regard as one of the urgent tasks of the USSR Academy of Sciences, the academies of sciences of the union republics, and the higher educational establishments, the comprehensive development of theoretical and scientific research studies in the field of polymers and similar materials, with the use of the latest achievements of physics and chemistry, in order to occupy in this field a leading place in the world in the next few years.

" . . . We must sharply increase the volume of scientific research in economic areas, particularly at enterprises and in central works laboratories which must become bases of the work of branch scientific research institutes. This should lead to a considerable cut in the time taken by laboratory and experimental work.*

" . . . In addition to this we must next improve the training of experts for the polymer materials, products, and articles industry and experts in chemical machine building, 30/ and in building means of automation. . . ."

Besides the problem of technology the shortage of chemical equipment has restricted chemical production. In 1955, for example, actual production of chemical equipment amounted to less than 80% of the planned goal; and to aggravate the supply situation, USSR producers of chemical equipment not only have failed to meet planned goals but also have consistently failed to manufacture the proper product-mix. Plans for the production of certain items have been overfulfilled, but the output of more important types of chemical equipment was short of demand. While attempts have been made to increase the production

* USSR procurement of technological know-how for low-pressure polyethylene from the West reportedly would reduce the time-lag before getting a plant in operation by five years. 29/

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of chemical equipment by standardization practices, the industry is falling behind the growing demands of the chemical industry for new types of equipment. 31/

This point was admitted by Khrushchev, "One must also say that the chemical equipment produced by the machine building industry is in some cases, as far as its technical level is concerned, lagging behind the best models of foreign countries." 32/ And, "The successful development of the chemical industry will require the developing of many designs of equipment in a short time and their introduction into production." 33/ There are a number of ways to overcome the problems involved in research and development and design of chemical equipment and plant. Obsolete processes, equipment and materials of construction may be used in place of more modern developments. Other methods include the procurement of engineering drawings and know-how, items of equipment for reproduction, and utilization of foreign technology. In meeting these problems, the USSR has used all of the above methods.*

Imports of Chemical Equipment and Plants from the West

Imports of chemical equipment and plant by the USSR from the West have been on the increase recently. Based on the 1957 trade agreement between France and the USSR covering the three-year period, 1957-1959, France is to supply the Soviet Union with 2,200 million francs (\$6.3 million) of chemical equipment. In 1957, the USSR contracted with a West German firm for a chemical plant, valued at 17 million DMW

* See especially p. 24-26, Production of Chemical Equipment in the USSR. 34/

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- 11 -

(\$4.1 million) to produce raw materials for a synthetic fiber, probably of the dacron type;* and, in April 1958, the USSR and West Germany made a trade agreement covering 1958-60. Under this agreement, the latter is to export equipment for the chemical industry, including equipment for the production of artificial fibers and plastics. 36/

Further imports of chemical equipment and plant, particularly those involving the latest developments in chemical technology, from the West are expected, 37/ even though Khrushchev indicated that the USSR would depend upon other Bloc countries for chemical equipment. 38/

The Bloc countries, including the USSR, generally lag behind the West in chemical technology, especially in the field of petrochemicals and related products which are significant in the current planned expansion of the USSR chemical industry; and as Khrushchev stated, "We will soon need a large amount of equipment which must be designed and produced anew. It would also be expedient to order part of this equipment in capitalist countries, primarily the United States, West Germany, and Britain." 39/ Recent efforts to obtain equipment from the West by the USSR for its current chemical expansion have been reported.

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estimate that Soviet purchases of chemical plants could possibly amount

* For other imports of chemical equipment and attempts to obtain technological know-how from the West, see Appendix C, Production of Chemical Equipment in the USSR. 35/

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- 12 -

to \$100 million. 40/ Among these plants are acetylene, acrylonitrile, polyethylene, polypropylene, ethylene, caprolactum (nylon), polyurethane, and synthetic rubber plants. 41/

While United States officials do not discount the probability that the Soviet Union is seeking to break down the restrictions by announcing its desire to purchase chemical equipment 42/ and by its emphasis on the expansion of synthetics production in a consumer context, the feeling in Washington is that the USSR seriously wishes to buy considerable equipment. 43/

Besides the use of technical people from the West in the fields of plastics and synthetic fibers, 44/ the procurement of technological know-how and equipment from the West would contribute significantly to the planned goals for the USSR chemical industry. As Khrushchev noted, "The Soviet Union would be given the opportunity of quicker fulfillment of its program for the construction of new chemical enterprises without wasting time on creation of plans and mastering of the production of new types of equipment." 45/ It is probable that, as in the past, the USSR will use such know-how and equipment as prototypes for further expansion of its chemical industry; and in several years become a serious competitor in the world chemical markets.

Next 1 Page(s) In Document Exempt